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PSYCHOLOGICAL LITERATURE.

I. NEUROLOGICAL.

Biologische Untersuchungen. GUSTAF RETZIUS. Neue Folge, Stockholm, 1890-94, Vols. I-VI.

This monumental work contains forty-five papers of critical interest to the student of biological science, especially in its neurological and histological departments. In fact, thirty-eight of the papers deal with special problems of the nervous system. The present series is stated to form a continuation in new form of the "*Biologische Untersuchungen*," published by Retzius in 1881 and 1882, the issue of which was interrupted among other things by his great monograph, "*Gehörorgan der Wirbelthiere*." The large form adopted is cumbersome, but has been chosen to avoid folding of the plates. Since there are one hundred and thirty-eight of these magnificent productions, this feature may be accorded the right of deciding the form. The long lines, however, make reading difficult, and this might have been so readily obviated that there seems no excuse for inflicting this inconvenience on the reader.

The work is evidently intended as a repository for critical reference, and no attempt can be made in the limits of a review to even summarize its contents. The earlier volumes deal largely with the nervous system in the invertebrates and lower vertebrates, together with its relations and mode of nerve supply and termination in the various sensory and motor organs, the chief methods employed being the Golgi and methyl blue in their various modifications. Great prominence is given in the last two volumes to the glia elements and Cajal'schen Zellen in the human and mammalian brain, four separate papers with thirty-two plates being devoted to them. Almost infinite variety of form and type is revealed, but in their manifoldness we are unable to detect any ground for Ramon y Cajal's recent theory that the glia elements by their contractions and expansions make and break contacts of nerve cells, and thus occasion states of sleep and waking. Retzius considers the glia elements to be not only supporting structures, but padding for the nerve cells as well. Hence they are more numerous where the nerve elements are scarce, and vice versa. That they may be thus actively contractile, he admits to be possible, but for such functions there is no evidence at present ("*keine Beweise vorliegen*"). He also declares himself "*kein Freund von schwebenden Hypothesen*." In his first volume he discussed in a most helpful manner the structure of "*Muskelfibrille und Sarcoplasma*," and I must admit a little disappointment at finding nothing on the minute structure of the nerve fibre and particularly of the nerve cell. We may hope that the author will be spared to do this justice in the near future.

On the whole this series is indispensable to every working laboratory. The plates are luminous, and make it possible for the eye-minded to learn at a glance what they might fail to gain so well by reading pages of descriptions. C. F. H.

The Function of the Frontal Lobes. L. BIANCHI. Brain, LXXII, pp. 497-522, 5 Figs. London, 1895.

Hitzig's shrewd observation that the frontal lobe increased proportionally to the rest of the brain as we ascend the scale of intelligence from cat, dog, monkey to man, leads naturally to the inference that this is the centre for intellectual functions.

His experiments on dogs, however, did not yield much support to this view. Still, from the absence of any demonstrable sensori-motor functions, the function of intelligence was almost forced upon the pre-frontal region by exclusion. The work of Ferrier, too, strengthened this position, since he found in monkeys loss of attention, apathy, etc., resulting from ablation of the pre-frontal lobes. On the other hand a definite function has been found for this region by Munk, Luciani, and recently by Groslik, in furnishing innervation to the muscles of the trunk.

Bianchi operated on twelve monkeys and six dogs, all successfully, and describes in this paper the results of excision of both pre-frontal lobes in one dog and three monkeys. Unilateral ablation produced no observable defect, either sensory or motor, lasting for more than a few days. Previous observers have gone astray, mainly from the fact that they have attached too much importance to the phenomena of irritation immediately following the operation. Bianchi states that these should be systematically disregarded for at least a week.

Passing briefly in review the chief results, we may observe that in the dog we find all motor and sensory functions normal, but his character is changed. "He goes about with eyes downcast, and head bent down, almost touching the floor with his nose." "Hovers about heavily and aimlessly." He picks up everything he finds, leaves, sticks, filth, in his mouth and drops them again. He becomes very timid and makes no attempt at defense. "Frightened, it doubles itself up without any attempt to escape from the attack."

The monkey gives similar, but even more striking results. Previous to the operation she has been taught a number of tricks, understands language without gestures, is very affectionate, as shown by her treatment of her companions, and especially her attachment to two puppies which she has adopted and mothers. She will not allow them to be taken away from her.

Considerable weakness results from ablation of the left frontal lobe (3½ g. being removed), especially marked in the right arm and right eye. She is still intelligent, takes an interest in her surroundings. She now cares for one puppy with her left arm and avoids the second. About eighty days after first operation, the right pre-frontal lobe was similarly excised. Marked and permanent results follow. Taste is so much impaired that she takes, chews and swallows bits of sugar and plaster indifferently and automatically. A normal monkey rejects with evident disgust a cherry which has been filled with quinine, while after ablation of the frontal lobes, she eats it, but with some hesitation. Vision remains considerably impaired. Psychically "the habitual state is one of indifference; and she speedily relapses (after being aroused) into an aimless automatic mode of life, without any in-